Amendments to the Claims:

The listing of claims below will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (cancelled)

2. (currently amended) A radar antenna assembly ~~as claimed in Claim 1, further including~~ for use as a transmitter, receiver or transceiver comprising:

a tubular casing having a radar-reflective inner surface and having a first end, a second end and a longitudinal axis;

a radar-reflective reflector closing said first end;

an aperture disposed at said second end;

focussing means at said second end;

at least one elongate antenna element extending substantially parallel to said longitudinal axis from said reflector towards said second end; and

dielectric material substantially filling the interior volume of said tubular casing.

3. (original) A radar antenna assembly as claimed in Claim 2, wherein said focussing means includes a plurality of concentric slit ring apertures located at said second end.

4. (original) A radar antenna assembly as claimed in Claim 2, wherein said focussing means includes at least one dielectric lens element located at said second end.

5. (original) A radar antenna assembly as claimed in Claim 4, wherein said dielectric lens element comprises a planar lens element.

6. (original) A radar antenna assembly as claimed in Claim 4, wherein said dielectric lens element comprises a planoconcave lens element.

7. (original) A radar antenna assembly as claimed in Claim 4, wherein said dielectric lens element comprises a planoconvex lens element.

8. (currently amended) A radar antenna assembly as claimed in Claim ~~1~~2, wherein said tubular casing has an inner diameter D_T of which is an integer multiple of the diameter D_A of said at least one antenna element.

9. (currently amended) ~~(~~A radar antenna assembly as claimed in Claim ~~1~~2, wherein said tubular casing has an interior length L_T which is an integer multiple of the length L_A of said at least one antenna element.

10. (currently amended) A radar antenna assembly as claimed in Claim ~~1~~2, wherein an interior surface of said tubular casing comprises an antenna cathode and said elongate antenna element comprises an antenna anode.

11. (original) A radar antenna assembly as claimed in Claim 10, wherein said elongate antenna element extends along said longitudinal axis.

12. (currently amended) A radar antenna assembly as claimed in Claim ~~1~~2, including at least two elongate antenna elements, at least one of which comprises an antenna cathode and at least one of which comprises an antenna anode.

13. (original) A radar antenna assembly as claimed in Claim 12, wherein said elongate antenna elements are disposed symmetrically about the longitudinal axis of the tubular casing.

14. (original) A radar antenna assembly as claimed in Claim 13, wherein said elongate antenna elements have substantially equal lengths and diameters.

15. (original) A radar antenna assembly as claimed in Claim 14, wherein the interior diameter D_T Of the tubular casing is an integer multiple of the diameter D_A of said elongate antenna elements and of the spacing between adjacent pairs of said elongate antenna elements.

16. (currently amended) A radar antenna assembly as claimed in Claim ~~1~~2, wherein said dielectric material is a liquid.

17. (currently amended) A radar antenna assembly as claimed in Claim ~~1~~2, wherein said dielectric material is a solid.

18. (currently amended) A radar antenna assembly as claimed in Claim ~~1~~2, wherein said dielectric material is a powdered solid packed into the interior of said tubular casing.

19. (original) A radar antenna assembly comprising a closed chamber adapted to contain a sample of material, said chamber including four substantially triangular side walls together defining an open-based pyramidal structure, said assembly including transmitter antenna elements disposed on interior surfaces of a first opposed pair of said triangular side walls and receiver antenna elements disposed on interior surfaces of a second opposed pair of said triangular side walls.

20. (original) A radar antenna assembly as claimed in Claim 19, wherein said antenna elements comprise bowtie dipole antennas with respective cathode and anode elements disposed on said opposed pairs of said triangular side walls.

21. (previously presented) A radar antenna apparatus as claimed in Claim 19, wherein the base of said pyramidal structure is closed by a generally planar base wall, said chamber comprising the interior volume of said pyramidal structure.

22. (previously presented) A radar antenna assembly as claimed in Claim 19, wherein said chamber comprises a closed volume communicating with the open base of said pyramidal structure.

23. (previously presented) A radar system comprising pulsed signal generating means, transmitter antenna means, receiver antenna means, control means for controlling the operation of said pulsed signal generating means, analog-digital converter means for digitising signals received by said receiver antenna means, and data storage means for storing said digitised signals, wherein said transmitter antenna means and receiver antenna means comprise at least one radar antenna including one of:

(i) a tubular casing having a radar-reflective inner surface and having a first end, a second end and a longitudinal axis;

a radar-reflective reflector closing said first end;

an aperture disposed at said second end;

at least one elongate antenna element extending substantially parallel to said longitudinal axis from said reflector towards said second end; and

dielectric material substantially filling the interior volume of said tubular casing; or

(ii) a closed chamber adapted to contain a sample of material, said chamber including four substantially triangular side walls together defining an open-based pyramidal structure, said assembly including transmitter antenna elements disposed on interior surfaces of a first opposed pair of said triangular side walls and receiver antenna elements disposed on interior surfaces of a second opposed pair of said triangular side walls.

24. (currently amended) A radar system as claimed in Claim 23, wherein said transmitter antenna means comprises at least one transmitter radar antenna assembly and said receiver antenna means comprises at least one receiver radar antenna assembly said transmitter antenna assembly and said receiver antenna ~~transmitter~~ assembly each comprising:

a tubular casing having a radar-reflective inner surface and having a first end, a second end and a longitudinal axis;

a radar-reflective reflector closing said first end;

an aperture disposed at said second end;

at least one elongate antenna element extending substantially parallel to said longitudinal axis from said reflector towards said second end; and dielectric material substantially filling the interior volume of said tubular casing.

25. (original) A radar system as claimed in Claim 24, wherein said transmitter and receiver antenna assemblies are disposed so as to transilluminate a subject.

26. (original) A radar system as claimed in Claim 24, wherein said transmitter and receiver antenna assemblies are disposed so as to be co-axially aligned on opposite sides of a subject.

27. (previously presented) A radar system as claimed in Claim 24, wherein said transmitter and receiver antenna assemblies are connected to a closed sample chamber adapted to enclose a subject.

28. (original) A radar system as claimed in Claim 24, wherein said transmitter and receiver antenna assemblies are disposed such that said receiver antenna assembly receives a signal transmitted by said transmitter antenna assembly and reflected from a subject.

29. (original) A radar system as claimed in Claim 28, wherein said transmitter and receiver antenna assemblies are arranged such that their longitudinal axes are substantially parallel to one another with their second ends facing in the same direction.

30. (previously presented) A radar system as claimed in Claim 28, wherein said system is adapted to be portable.

31. (previously presented) A radar system as claimed in Claim 28, wherein said system is adapted to be carried by a land vehicle.

32. (previously presented) A radar system as claimed in Claim 28, wherein said system is adapted to be carried by a water-borne vessel.

33. (previously presented) A radar system as claimed in Claim 28, wherein said system is adapted to be carried by a submersible vehicle.

34. (previously presented) A radar system as claimed in Claim 28, wherein said system is adapted to be carried by an airborne vehicle.

35. (previously presented) A radar system as claimed in Claim 28, wherein said system is adapted to be carried by a space vehicle.

36. (previously presented) A radar system as claimed in Claim 28, wherein the position of said transmitter antenna assembly is fixed relative to said receiver antenna assembly.

37. (previously presented) A radar system as claimed in Claim 28, wherein at least one of said transmitter antenna assembly and said second antenna assembly is adapted to be movable relative to a subject.

38. (previously presented) A radar system as claimed in Claim 28 in which one of said transmitter and receiver antenna assemblies is adapted to be movable relative to the other.

39. (previously presented) A radar system as claimed in Claim 28, including a plurality of transmitter antenna assemblies.

40. (previously presented) A radar system as claimed in Claim 28, including a plurality of receiver antenna assemblies.

41. (previously presented) A radar system as claimed in Claim 28, for use with close range subjects, in which said control means is adapted to control said pulsed signal generating means so as to generate pulses with a pulse repetition frequency of the order of 100 kHz.

42. (previously presented) A radar system as claimed in Claim 28, for use with close range subjects, in which said control means is adapted to control said pulsed signal generating means so as to generate pulses with a pulse width in the range 0.01 to 0.1 nanoseconds.

43. (previously presented) A radar system as claimed in Claim 28, for use with close range subjects, adapted to capture data in a time range of 2 to 25 nanoseconds.

44. (previously presented) A radar system as claimed in Claim 28, for use with close range subjects, adapted to transmit pulses with a minimum frequency in the range 100 to 1000 MHz and with a maximum frequency in the range 1000 to 10000 MHz.

45. (previously presented) A radar system as claimed in Claim 28, for use with close to medium range subjects, in which said control means is adapted to control said pulsed signal

generating means so as to generate pulses with a pulse repetition frequency of the order of 25 to 100 kHz.

46. (previously presented) A radar system as claimed in Claim 28, for use with close to medium range subjects, in which said control means is adapted to control said pulsed signal generating means so as to generate pulses with a pulse width in the range 1 to 10 nanoseconds.

47. (previously presented) A radar system as claimed in Claim 28, for use with close to medium range subjects, adapted to capture data in a time range of 2000 to 10000 nanoseconds.

48. (previously presented) A radar system as claimed in Claim 28, for use with close to medium range subjects, adapted to transmit pulses with a minimum frequency in the range 12.5 to 125 MHz and with a maximum frequency in the range 200 to 2000 MHz.

49. (previously presented) A radar system as claimed in Claim 28, for use with long range subjects, in which said control means is adapted to control said pulsed signal generating means so as to generate pulses with a pulse repetition frequency of the order of 3.125 to 50 kHz.

50. (previously presented) A radar system as claimed in Claim 28, for use with long range subjects, in which said control means is adapted to control said pulsed signal generating means so as to generate pulses with a pulse width in the range 10 to 25 nanoseconds.

51. (previously presented) A radar system as claimed in Claim 28, for use with long range subjects, adapted to capture data in a time range of 20000 to 250000 nanoseconds.

52. (previously presented) A radar system as claimed in Claim 28, for use with long range subjects, adapted to transmit pulses with a minimum frequency in the range 1 to 12.5 MHz and with a maximum frequency in the range 12.5 to 200 MHz.

53. (previously presented) A radar system as claimed in Claim 28, further including data processing means for processing said digitised signals.

54. (original) A radar system as claimed in Claim 53, wherein said data processing means is adapted to process said digitised signals for the purposes of at least one of imaging, measuring, mapping, detecting, identifying and typecasting said subject.

55. (currently amended) A method of typecasting a subject comprising the steps of: irradiating the subject with a pulsed, broad band radar frequency signal transmitted by at least one transmitter antenna; detecting a return signal following interaction of said transmitted signal with said subject, using at least one receiver antenna; calculating an energy/-frequency spectrum of said return signal; and analysing said energy/-frequency spectrum to obtain a characteristic energy/-frequency signature of said subject.

56. (currently amended) A method as claimed in Claim 55, wherein said step of analysing said energy/-frequency spectrum comprises performing a statistical analysis of said energy/-frequency spectrum.

57. (original) A method as claimed in Claim 56, wherein said statistical analysis includes at least one of principal components analysis, maximum likelihood classification and multivariate classification.

58. (currently amended) A method as claimed in Claim 55, wherein said step of analysing said energy/-frequency spectrum comprises frequency classification using energy bins.

59. (currently amended) A method as claimed in Claim 55, wherein said step of analysing said energy/frequency spectrum comprises energy classification using frequency bins.

60. (currently amended) A method of identifying an unknown subject comprising the steps of:

obtaining an energy/-frequency signature of said subject ~~using the method of Claim 55~~ by irradiating the subject with a pulsed, broad band radar frequency signal transmitted by at least one transmitter antenna; detecting a return signal following interaction of said transmitted signal with said subject, using at least one receiver antenna; calculating an energy/frequency spectrum

of said return signal; and analysing said energy/frequency spectrum to obtain a characteristic energy/frequency signature of said subject; and

comparing said energy/-frequency signature of the unknown subject to a database of energy/-frequency signatures of known subjects ~~previously obtained using the method of Claim 55~~.

61. (currently amended) A method ~~as claimed in Claim 55, implemented using a radar system as claimed in Claim 53.~~ of typecasting a subject comprising the steps of: irradiating the subject with a pulsed, broad band radar frequency signal transmitted by at least one transmitter antenna; detecting a return signal following interaction of said transmitted signal with said subject, using at least one receiver antenna; calculating an energy/frequency spectrum of said return signal; and analysing said energy/frequency spectrum to obtain a characteristic energy/frequency signature of said subject,

wherein the method is implemented using a radar system comprising pulsed signal generating means, transmitter antenna means, receiver antenna means, control means for controlling the operation of said pulsed signal generating means, analog-digital converter means for digitising signals received by said receiver antenna means, data processing means for processing said digitised signals, and data storage means for storing said digitised signals, wherein said transmitter antenna means and receiver antenna means comprise at least one radar antenna including one of:

(i) a tubular casing having a radar-reflective inner surface and having a first end, a second end and a longitudinal axis;

a radar-reflective reflector closing said first end;

an aperture disposed at said second end;

at least one elongate antenna element extending substantially parallel to said longitudinal axis from said reflector towards said second end; and

dielectric material substantially filling the interior volume of said tubular casing; or

(ii) a closed chamber adapted to contain a sample of material, said chamber including four substantially triangular side walls together defining an open-based pyramidal structure, said assembly including transmitter antenna elements disposed on interior surfaces of a first opposed

pair of said triangular side walls and receiver antenna elements disposed on interior surfaces of a second opposed pair of said triangular side walls

said transmitter antenna means comprises at least one transmitter radar antenna assembly and said receiver antenna means comprises at least one receiver radar antenna assembly, said transmitter antenna assembly and said receiver antenna assembly disposed such that said receiver antenna assembly receives a signal transmitted by said transmitter antenna assembly and reflected from a subject, said transmitter antenna assembly and said receiver antenna assembly each comprising:

a tubular casing having a radar-reflective inner surface and having a first end, a second end and a longitudinal axis;

a radar-reflective reflector closing said first end;

an aperture disposed at said second end;

at least one elongate antenna element extending substantially parallel to said longitudinal axis from said reflector towards said second end; and dielectric material substantially filling the interior volume of said tubular casing.

62. (currently amended) A radar system as claimed in Claim ~~53~~23,

wherein said transmitter antenna means comprises at least one transmitter radar antenna assembly and said receiver antenna means comprises at least one receiver radar antenna assembly, said transmitter antenna assembly and said receiver antenna assembly disposed such that said receiver antenna assembly receives a signal transmitted by said transmitter antenna assembly and reflected from a subject, said transmitter antenna assembly and said receiver antenna assembly each comprising:

a tubular casing having a radar-reflective inner surface and having a first end, a second end and a longitudinal axis;

a radar-reflective reflector closing said first end;

an aperture disposed at said second end;

at least one elongate antenna element extending substantially parallel to said longitudinal axis from said reflector towards said second end; and dielectric material substantially filling the interior volume of said tubular casing,

the system further including data processing means for processing said digitised signals, wherein said data processing means is adapted to ~~perform the method of Claim 55.~~ typecast a

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subject by: irradiating the subject with a pulsed, broad band radar frequency signal transmitted by at least one transmitter antenna; detecting a return signal following interaction of said transmitted signal with said subject, using at least one receiver antenna; calculating an energy/frequency spectrum of said return signal; and analysing said energy/frequency spectrum to obtain a characteristic energy/frequency signature of said subject.